Testosterone serum levels were higher in non-survivors women than in survivors ($p = 0.001$) regardless of the postmenopausal state, whereas they resulted reduced in burn men without a significant difference considering the outcome. Plasma levels of prolactin were significantly lower as well in men as in women who died than in those who survived ($p = 0.029$ and $p < 0.001$, respectively). No significant difference between survivors and non-survivors was found in plasma FSH and LH levels.
Conclusion: Gonadic setting in our population of burn patients resulted only in part consistent with well-known pathophysiological mechanisms. Prolactin levels' reduction can be partly explained by the early dopamine infusion, but the lack of stress-induced hyperprolactinemia also in patients not receiving dopamine was unexpected; furthermore we did not find such an important gonadotropin suppression as stress should have led to. Finally, the most interesting data was testosterone and estradiol increase in postmenopausal women with the worst outcome: peripheral actions such as aromatization are likely to be involved. More data are needed for a better comprehension, especially because of the estradiol chance of being not only a marker of global inflammatory response, but also a possible agent in the development of burn complications.
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OC012

The aftercare nurse in the burns outpatient clinic of the burn centre: An overview of activities May 2006–April 2009

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Rationale: Coming home after hospitalisation is a happy occasion for most patients. For burn survivors, however, this can be different: how to cope with changes in appearance, with a disrupted everyday life? Only after discharge the problems concerning the burns and their consequences become clear. To spot and tackle practical and psychosocial problems of burn patients and their relatives, like wound care, mobility problems and itching, but also anxiety, depression and post traumatic stress we started in May 2006 a nurse outpatient clinic. Here patients can consult the burn nurse about various issues. She offers information and counselling and when necessary refers to other (burn care) professionals. The aftercare nurse works in close consultation with a multidisciplinary team.
Methods: At discharge a brochure is handed out to the patient. Patients are actively approached and invited by the aftercare nurse or can apply for specialised aftercare themselves. In addition, patients are referred by professionals of the clinical daycare or outpatients clinic. Patient information and files are managed in a database.
Results: A total of 262 patients were seen in 34 months. The majority of patients were young, 39.2% was under 5 years of age. The age of patients ranged from 0 up to 79 years. Scalds were the major cause of burn (42.0%) followed by flame (35.9%) and fat burns (9.2%). The mean TBSA was 10.3%, ranging from 1 to 84%. The number of contacts with the aftercare nurse varied between 1 and 14. On average patients had three contacts. In 31.3% the aftercare nurse referred to another specialist, predominantly the psychologist (68.3%).
Conclusion: Aftercare for burn survivors and their relatives is vital. The aftercare nurse plays a key role in its coordination and implementation and in the referral to relevant other (burn care) professionals.
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OC013

Assessment of workload in dressing changes in a burn center

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Rationale: Workload in a burn unit is very important. It is assessed only by few studies. The impact is major on the team life: professional lifetime; prevention of infection and quality of care. The workload in our burn unit was assessed by an independent society. They focus on dressing changes under general anesthesia, and operative theatre activity.
Methods: During 3 weeks, we complete a reference worksheet. the hour of beginning, hour of end, and all the personnel (quantity and quality) used was noted. The interpreting process was made by an independent board.
Results: The audit was realised from the first to the 21st December 2008. During this period 127 events were recorded: 20 surgical interventions, 3 admissions in intensive care and 104 dressing changes. Dressing changes begin at 08h00 AM and most are closed after 12h15. The team occupation (anesthesiologists, nurses specialized in anesthesiology, nurses and nurse's aid) is over 90% during this time. Surgeons worked only in operating theatre. The operating theatre was used during 4 h and 30 min 4 days a week. Nurses specialised in surgical intervention were usually free after 12h00 to 03h00 (end of work). Despite a worksheet built only for operating theatre analyze, the results are similar as reality. In the morning it is difficult to absorb more activity: admission, emergency care, etc. A very strict organization is essential. We find flexibility only in the afternoon. The rhythm of work is tiring. It probably explain that the professional lifetime in this type of unit of nurses is usually under 5 years.
Conclusion: The workload is very high in a burn unit, it is now demonstrated by this independent study. These results must be probably similar in the others burns unit. More studies are necessary to assess the impact of this specific workload on the quality of care.
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OC014

Ventilation of burn victims without inhalation injury is associated with increased fluid requirements and morbidity☆

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Rationale: It has recently been reported that burn victims who are primarily treated by positive pressure mechanical ventilation (PPV) without the presence of inhalation injury (INHI) show an increased need for fluid resuscitation. In the present study we investigated whether PPV-induced fluid requirements affect patient outcome.
Methods: 186 patients with burns of more than 30% of the total body surface area (TBSA) who were admitted to the Beverwijk Burns Centre between 1995 and 2006 were retrospectively studied. Patients were typically male (72.6%) and aged 38 ± 17 years. Cumulative fluid balance (CFB) was calculated on days 3 and 7 post-burn. The population was divided into three groups: (1) INHI-PPV- (no INHI, no ventilation, $n = 75$); (2) INHI-PPV+ (ventilation without INHI; $n = 62$); and (3) INHI+PPV+ (ventilation with INHI; $n = 49$). Data are represented as mean ± SD and were analyzed by ANOVA/regression analysis with TBSA, weight and age as covariates or a Chi-square test.
Results: CFB was significantly higher on day 7 in both ventilation groups, compared to non-ventilated patients (22.0 ± 9.5, 34.2 ± 15.9 and 35.7 ± 14.1 l for INHI-PPV-, INHI-PPV+ and INHI+PPV+, $P < 0.001$ vs non-ventilated patients). Ventilation of patients without INHI was associated with an increased length of hospital stay (LOHS) corrected for %TBSA ($P = 0.007$), development of sepsis ($P = 0.014$), development of organ dysfunction ($P = 0.001$), a lower pO2/fiO2 ratio ($P = 0.001$) and increased use of inotropics ($P = 0.004$). Overall mortality rates were highly influenced by % TBSA ($P = 0.000$) and age ($P = 0.000$).
Conclusion: In conclusion, ventilation-associated increased requirements of fluid resuscitation in burn patients may alter outcome in terms of the development of organ dysfunction, LOHS and complications. These results warrant consideration when deciding to intubate and commence mechanical ventilation in burn patients.
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OC015

Morbidity and mortality of blood stream infections in severely burned patients☆

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Rationale: The objective of this study was to investigate the epidemiology of bloodstream infection (BSI) in severely burned patients.
Methods: We retrospectively collected (1992–2006) data of all adult patients admitted to the burn unit of Ghent University Hospital whose burn unit stay was complicated by microbiologically documented BSI ($n = 76$). Mortality was evaluated with the BOBI score.
Results: During the study period approximately 1125 patients were admitted to the burn unit, whereof 76 developed a BSI (6.7%). In total, 178 episodes of BSI occurred, resulting in a prevalence of 15.8 episodes/100 admissions. Predominant pathogens were *P. aeruginosa* (17.1%), *S. aureus* (12.6%) and coagulase-negative *Staphylococcus* (13.8%). The appropriate antibiotic therapy was initiated in 76.3% within the first 48 h (and 65.8% within 24 h). The source of the infection was the burn wound in 47.2%, the catheter in 24.7% and in 16.9% not certain. The median time to BSI was 11 days (IQR: 5.3–19.8), and median ICU stay was 47 days (IQR: 26.3–82.5). Median BSA was 40.0% (IQR: 25.3–50.0), median age was 41.6 years (IQR: 31.3–52.8), and respiratory failure was present in 46 patients (61%) with a median of 21 mechanical ventilation days (IQR: 15.0–33.0). Acute renal failure was present in 5 cases (6.6%), and 44 patients required vasopressors (57.9%) because of

hemodynamic failure. Inhalation injury was present in 35 patients (46.1%). Nine patients died (11.8%), which was less than expected with the BOBI score (not significant): median BOBI score was 4 (mean 3.7) representing an expected mortality rate of 20%.
Conclusion: In this cohort, BSI occurred in 7% of the burn patients, with an observed mortality of 12%. This did not deviate from the mortality as predicted by the BOBI score, in spite of moderate rates of appropriate antibiotic therapy within the first 48 h. As such, BSI does not adversely affect survival in burn patients on the condition of early appropriate therapy.
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OC016

Clonal enrichment of integrated resistance plasmid-containing *Staphylococcus aureus* in a burn centre associated with persistent carriage among health care workers☆

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Rationale: Burn wound surfaces are generally infected by *S. aureus*, but the reservoirs and transmission routes remain to be elucidated. The genetic population structure of serial *S. aureus* isolates obtained from patients and healthcare workers (HCWs) in a burn centre was investigated; we assessed the frequency of auto- versus exo-infection and established a model describing import and local persistence of *S. aureus* clones.
Methods: Three populations of *S. aureus* isolates were collected (2001–2005) and typed by PFGE. Population I comprised 375 strains from HCWs, Population II harboured 586 nosocomially acquired strains from burn wounds. Population III involved 202 strains from patients at admission. Comparative genome hybridisation (CGH) was performed for endemic versus incidental *S. aureus* strains
Results: The diversity index for Population III was significantly higher than those for Populations I and II. Three PFGE types were clearly endemic among HCWs and nosocomially acquired *S. aureus* strains. CGH revealed that endemic strains possessed a potentially integrated plasmid encoding resistance to heavy metals.
Conclusion: Genetic diversity for *S. aureus* strains circulating in the burn centre was lower than that of strains in the open community. Apparently, endemic *S. aureus* clones have a superior potential to colonize burns which may be associated with their heavy metal resistance in an environment where silver and cerium containing topical agents are the most used.
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OC017

Colistin covered silk membranes against wound infection with *Pseudomonas aeruginosa*☆

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Rationale: Wound infections by multidrug-resistant bacteria are a major issue in wound care. An occlusive dressing delivering an antimicrobial agent to the wound over several days may be advantageous. The objective of this study was to create an occlusive silk membrane (pore size of <100 nm) loaded with colistin in order to establish an effective antimicrobial wound dressing against Gram-negative bacteria in vitro and in vivo.
Methods: The membranes (100 μm thick, pore size < 100 nm) were produced from fibroin, the silk protein. Membranes were covered with a log-scale colistin dilution (0.027–270 mg/ml) and a modified Microbroth Dilution assay against *Pseudomonas aeruginosa* (ATCC 27853) was performed. A rat burn infection model (RBIM) was used to demonstrate the antimicrobial activity of the colistin loaded silk membrane (270 mg/ml). Finally a porcine wound infection model was performed to study dose–response (2.7, 27 and 270 mg/ml) in a time dependent manner (0, 2, 4 and 6 days). Wound fluids and tissue biopsies were collected for quantification of colony forming units (cfu).
Results: The in vitro study demonstrated a concentration dependent antimicrobial effect against *P. aeruginosa* with complete elimination at the highest concentrations (2.7, 27 and 270 mg/ml). All colistin membranes demonstrated lower cfu counts compared to the corresponding PBS or carrier controls. Within the RBIM a cfu reduction of more than 3 log-scales was observed for the colistin covered silk membrane after 3 days. On average the wounds' cfu quantity remained at > 1000 during the whole follow-up of 6 days, apart from 3 wounds where complete bacterial clearance was observed.
Conclusion: This study demonstrates that this occlusive silk membrane loaded with an antimicrobial agent is a feasible and effective dressing for wound care.
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OC018

Impact of wound healing problems and *P. aeruginosa* on burn patients

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Rationale: One of the predominant pathogens in burn wound centres is *Pseudomonas aeruginosa*. To assess the impact of *P. aeruginosa* on burn patients, a review of burn patients admitted to the Beverwijk Burn Centre was carried out.
Methods: Patients with wound healing problems and *P. aeruginosa* were assigned to the study group ($n = 23$). Wound healing problems were defined as hyper granulation, poor graft take, graft loss, progression of wound depth and delayed wound healing. Patients were assigned to control group 1 ($n = 25$) when the presence of *P. aeruginosa* in their wounds was not accompanied by wound healing problems. Control group 2 was compiled of patients without positive swabs for *P. aeruginosa* and were matched with the study group for age, sex, total body surface area burned (TBSA) and percentage full thickness burns ($n = 19$). Premorbid conditions did not differ between groups.
Results: Compared to control group 1, the study group was characterized by higher TBSA, higher percentage full thickness burns and more often inhalation injury. In addition, *P. aeruginosa* and *Staphylococcus aureus* were detected 9.5 and 16.3 days later in the burn wound respectively and both were found more frequently together in one burn at the same time. The study group had compared to control group 2: poorer per-operative quality of wound bed, reduced graft take (86%), 1.8 times more skin transplanting surgeries and 1.7 times longer length of stay. Wound healing problems contributed significantly to a lack of beneficial effects of initial therapy against *P. aeruginosa*, graft take, number of skin transplanting surgeries and length of stay as determined by hierarchical multiple regression.
Conclusion: The presence of *P. aeruginosa* together with wound healing problems severely affect the clinical course and outcome of patients with large burns.
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OC019

Human cytomegalovirus DNA detection in plasma of severe burn patients: A prospective study☆

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Rationale: Burn patients are known to be immunocompromised, and it is generally accepted that human cytomegalovirus (HCMV) infection can cause severe disease in immunocompromised patients. But the limited available literature remains controversial whether HCMV infection contribute to the morbidity and mortality of burn patients.
Methods: We examined HCMV load in plasma samples by polymerase chain reaction (PCR) in a prospective cohort of severe burn patients. Plasma samples were collected twice a week from the admission until discharge from the center. Specific CMV serology was also performed at admission. A HCMV infection was defined by a positive plasma DNA detection.
Results: We studied eight patients over a 6-month period. Age varied between 23 and 81 years (mean 52 years), and the total body surface burned between 15% and 93% (mean 40%). Prolonged sedation and mechanical ventilation were required in all cases. HCMV IgG were negative in 2 patients at admission. HCMV DNA was never detected in these two patients. Human CMV DNA was detected in 5 of the 6 seropositive patients. The mean delay of DNA detection from admission was 19 days (range 13–24 days). For 3 patients, HCMV DNA detection and serology were performed simultaneously during the hospital stay. In two of them, IgM remained negative. The third patient had a positive IgM reaction 21 days after DNA detection. The pathogenic role of HCMV was considered to be involved in one patient who developed a haemophagocytic syndrome.
Conclusion: These results demonstrate that HCMV infection is frequent in seropositive burn patients. Diagnosis of HCMV infection is achieved earlier by PCR than specific serology. As a results, HCMV infection may have been under estimated in